UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,825	06/13/2005	Chun Ye	290.1159USN	5176

33369 7590 08/15/2006

FASTH LAW OFFICES (ROLF FASTH)
26 PINECREST PLAZA, SUITE 2
SOUTHERN PINES, NC 28387-4301

EXAMINER	
CHAPEL, DEREK S	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/538,825	YE, CHUN	
	Examiner	Art Unit	
	Derek S. Chapel	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-66* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12,14-18 and 30-61* is/are rejected.

7)☒ Claim(s) *11, 13, 19-29 and 62-66* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status Of Claims

1. Acknowledgement is made to the preliminary amendment filed on 6/13/2005 in which claims 1-66 were amended. Claims 1-66 are pending.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

3. The International Search Report filed on 9/8/2005 was considered.

Drawings

4. The drawings received on 6/13/2005 are acknowledged and accepted.

Specification

5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

6. The disclosure is objected to because of the following informalities:

a. "Normal optical rotator or Faraday rotator" should be changed to --Normal optical rotators or Faraday rotators-- in the Summary of the Invention section on page 4, line 12 of the specification;

b. "avoided by introduce" should be changed to --avoided by introducing-- in the Further Background section on page 9, line 22 of the specification.

Appropriate correction is required.

Claim Objections

7. Claims 2, 3, and 6-58 are objected to because of the following informalities:

a. All instances of "preferable" and "typically" must be removed from claims 2, 7, 9, 12, 16, 17 and 23.

b. Claim 3 recites the limitation "the exit or entrance polarizer" in line 3 of claim 3. There is insufficient antecedent basis for this limitation in the claim.

c. Claim 14 recites the limitation "said passive optical rotator" in line 7 of claim 14. There is insufficient antecedent basis for this limitation in the claim. For the purpose of this examination "dispersive" is taken to mean --passive-- on line 3 of claim 14 to fix the antecedent basis problem.

d. Claim 6 recites the limitation "means for rotating said orientation-sensitive polarizing element(s) about said light beam axis or/and varying said rotation angle(s)". Since 'or/and' is used, it is interpreted by the examiner that rotating said orientation-sensitive polarizing element(s) about said light beam axis *or* varying said rotation angles (of the dispersive polarization rotator) is sufficient to

meet this limitation, and doing both rotating said orientation-sensitive polarizing element(s) about said light beam axis and varying said rotation angles is not necessary. Therefore, any other parts of claim 6 and claims 7-58 (dependent on claim 6) that requires both rotating said orientation-sensitive polarizing element(s) about said light beam axis and varying said rotation angles is not given significant patentable weight.

e. "comprises of tuning" should be changed to --comprises tuning-- in claim 66.

f. Claim 66 must end in a period.

Appropriate correction is required.

8. Claims 8, 15 and 18 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim *should refer to other claims in the alternative only*. See MPEP § 608.01(n). It is noted by the examiner that in this case "according to claim 3" and any permutations thereof have not been given significant patentable weight.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. With respect to claims 4-5, where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition

so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "polarizing element" in claims 4 and 5 is used by the claim to mean "retarder", while the accepted meaning is "A polarizer is a device that converts an unpolarized or mixed-polarization beam of electromagnetic waves into a beam with a single polarization state (www.wikipedia.org)." The term is indefinite because the specification does not clearly redefine the term. It is noted by the examiner that a retarder does not polarize light in the conventional sense and the term "polarizing element" implies that the light is polarized by the element, as a result claims 4 and 5 have not been examined by the examiner. A term such as --polarization element-- may be a better description than "polarizing element" and "polarizing element" will be interpreted as --polarization element-- for the remainder of the claims 6-66.

11. Claims 17 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is noted that claims 17 and 18 claim a *stationary* exit polarizer and are dependent on claim 6 which claims a *rotatable* exit polarizer.

12. Claims 30-58 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 30, 37, 44 and 52 claim a spectral filter without intermediate polarizers, but it is unclear as to where the intermediate polarizers are not to be located. It is not clear if there are not supposed to be any polarizers at all

in-between the entrance or exit polarizers or if there are not supposed to be any polarizers inside the individual stages of the filter. For the purpose of this examination this limitation is interpreted to mean that there can be polarizers in-between the entrance and exit polarizers and in-between the individual stages of the filter, as recited in claim 19, but not inside the individual stages of the filter. Claims 31-36, 38-43, 45-51 and 53-58 are dependent on claims 30, 37, 44 and 52 respectively and are therefore rejected for the same reasons as the claims they are dependent on.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14. Claims 1-3, 6-11, 14-16 and 59-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Terahara et al., U.S. Patent Publication 2001/0010593, of record (hereafter Terahara).

15. As to claim 1, Terahara teaches a tuner as constituent component for constructing a tunable or switchable spectral filter over a wavelength range comprising elements arranged in cascade along a light beam axis characterized by a dispersive

polarization rotator (See Figs. 7A and 7B, Element FR; It is noted by the examiner that the variable Faraday rotators disclosed in Terahara are interpreted to be dispersive in that their rotation angle varies as a function of input light wavelength.), having its rotation angle $\rho(\lambda)$ varying as a function of light wavelength λ over said wavelength range (See Page 5, Paragraphs 0087-0091 and Figure 9); an orientation-sensitive polarizing element (See Figs. 7A and 7B, Elements P1 and P2 and Fig. 8 and Pages 4 and 5, Paragraphs 0076-0078), and means for rotating said polarizing element or/and varying said rotation angle $\rho(\lambda)$ (See Figs. 7A, 7B and 17, Element FR and Paragraph 0114); whereby said polarization rotator and said polarizing element are arranged in series in said spectral filter along said light beam axis with said polarizing element oriented at a predetermined orientation angle related to the structure of said spectral filter, and said tuner is operated by rotating said polarizing element to change its orientation in said filter or/and by changing said rotation angle (See Figs. 7A and 7B and Pages 4 and 5, Paragraphs 0076-0080).

16. As to claim 2, Terahara teaches the combination of claim 1, wherein said polarization rotator is a dispersive optical rotator, a quartz optical rotator, or a dispersive Faraday rotator, to which a magnetic field is applied, that has the rotation angle changeable by adjusting a magnetic flux density of said magnetic field (See Figs. 7A and 7B, Element FR, Pages 4 and 5, Paragraphs 0076-0080 and the examiner's note in section 15 of this office action). It is noted by the examiner that limitations following "preferably" or "typically", such as "preferable is a dispersive optical rotator, typically a quartz optical rotator, or a dispersive Faraday rotator, to which a magnetic field is

applied, that has the rotation angle changeable by adjusting a magnetic flux density of said magnetic field" have not been given significant patentable weight.

17. As to claim 3, Terahara teaches the combination of claim 1, wherein said polarizing element is a polarizer (See Figs. 7A and 7B, Elements P1 and P2), used as an exit or entrance polarizer of said filter and having its azimuth P relative to the reference axis of said filter, said polarization rotator and said polarizer are arranged in said spectral filter along said light beam axis with said polarization rotator followed or preceded by said polarizer (See Figs. 7A and 7B), and said tuner is a polarizer-tuner, which is equivalent to a polarizer having the azimuth equal to P+ $\rho(\lambda)$ or P- $\rho(\lambda)$ varying as a function of light wavelength λ over said wavelength range, and is operated by changing said azimuth P or/and said rotation angle $\rho(\lambda)$ to change said azimuth P+ $\rho(\lambda)$ or P- $\rho(\lambda)$ of said polarizer-tuner (See Pages 4 and 5, Paragraphs 0076-0088).

18. As to claim 6, Terahara teaches a spectral filter over a wavelength range comprising elements arranged in cascade along a light beam axis characterized by an entrance polarizer (See Figs. 7A and 7B, Element P1); at least a dispersive polarization rotator with the rotation angle varying as a function of light wavelength over said wavelength range (See Figs. 7A and 7B, Element FR, Pages 4 and 5, Paragraphs 0076-0080 and the examiner's note in section 15 of this office action); at least an orientation-sensitive polarizing element (See Figs. 7A and 7B, Elements BP, P1 or P2); and means for rotating said orientation-sensitive polarizing element(s) about said light beam axis or/and varying said rotation angle(s) (See Figs. 7A and 7B, Element FR and Pages 4 and 5, Paragraphs 076-0080); whereby said polarizing element or at least one

of said polarizing elements is a polarizer (See Figs. 7A and 7B, Elements P1 and P2), said polarization rotator(s) and polarizing element(s) are arranged behind said entrance polarizer along said beam axis to form tuner(s) such that said polarizing element that is a polarizer works as the exit polarizer of said filter (See Figs. 7A and 7B, Elements BP, FR, P1 and P2), and said filter has its spectral transmission determined by said rotation angle(s) (See Figs. 8 and 9) and tunable by rotating said exit polarizer or/and the other(s) of said polarizing element(s) about said beam axis and further tunable by varying said rotation angle(s) (See examiner's note in section 7(d) of this office action).

19. As to claim 7, Terahara teaches the combination of claim 6, wherein said polarization rotator(s) is or are dispersive optical rotator(s), quartz optical rotator(s), or Faraday rotator(s), to which magnetic field is or are applied, having the rotation angle(s) changeable by adjusting the magnetic flux density or densities of said magnetic field(s) (See Figs. 7A and 7B, Element FR, Pages 4 and 5, Paragraphs 0076-0080) and said polarizing element(s) is or are polarizer(s) (See Figs. 7A and 7B, Element P1 and P2), dichroic or birefringent polarizer(s), or retarder(s) selected from achromatic or zero-order birefringent retarders, equivalent liquid crystal electrically rotatable retarders, including FLC cells, SmA* cells, DHF liquid crystal cells, SSFLC cells, planar aligned smectic C* cells and ternary state antiferroelectric-effect LC cells, and variable retarders, including liquid crystal variable retarders such as nematic or homeotropically aligned smectic LC cells and phase modulators such as electro-optical, photo-elastic and magnetic modulators (See Figs. 7A and 7B, Element BP). It is noted by the

examiner that limitations following "preferably" or "typically" have not been given significant patentable weight.

20. As to claims 8-10, Terahara teaches the combination of claim 6, wherein said filter is a single-stage spectral filter over said wavelength range comprising elements arranged in cascade along said light beam axis including an entrance polarizer (See Figs. 7A and 7B); a dispersive polarization rotator with the rotation angle varying as a function of light wavelength over said wavelength range, selected from optical rotators and Faraday rotators having the rotation angle changeable by adjusting the magnetic flux density of said magnetic field (See Figs. 7A and 7B, Element FR, Pages 4 and 5, Paragraphs 0076-0080); an exit polarizer (See Figs. 7A and 7B); and means for rotating said exit polarizer about said light beam axis (See examiner's note in section 7(d) of this office action); whereby said polarization rotator is sandwiched between said entrance and exit polarizers (See Figs. 7A and 7B) with the combination of said polarization rotator and polarizer equivalent to a polarizer-tuner and said filter has its spectral transmission determined by said rotation angle and tunable by rotating said exit polarizer about said beam axis relative to said entrance polarizer and further tunable by varying said rotation angle (See examiner's note in section 7(d) of this office action).

21. As to claim 14, Terahara teaches the combination of claims 8, wherein said polarization rotator is a *passive* optical rotator (See Figs. 7A and 7B, Element BP; It is noted by the examiner that the birefringent plate of Terahara is believed to be acting as a retarder in figures 7A and 7B since it is a single beam system and the birefringent plate is not splitting the beam. Therefore, the birefringent plate of Terahara is

considered to be a passive optical rotator in that the birefringent plate changes the phase delay of one polarization with respect to the orthogonal polarization, thus rotating the polarization of the light, which is then rotated by the exit polarizer or the Faraday rotator.), said filter further comprises an active polarization rotator (See Figs. 7A and 7B, Element FR, Pages 4 and 5, Paragraphs 0076-0080) having its rotation angle adjustable over said wavelength range, positioned immediately before or behind said passive optical rotator (See Figs. 7A and 7B), and means for changing the rotation angle of said active polarization rotator (See Pages 4 and 5, Paragraphs 0076-0080).

22. As to claim 15, Terahara teaches the combination of claim 14, wherein the combination of said optical rotator (See Figs. 7A and 7B, Element BP), active polarization rotator (See Figs. 7A and 7B, Element FR) and polarizer (See Figs. 7A and 7B, Elements P1 or P2) is equivalent to a polarizer-tuner and said filter has its spectral transmission tunable or switchable by changing said rotation angle of said active polarization rotator (See Figs. 8 and 9) and further tunable by rotating said exit polarizer relative to said entrance polarizer (See examiner's note in section 7(d) of this office action).

23. As to claim 16, Terahara teaches the combination of claim 15, wherein said active polarization rotator is a Faraday rotator (See Figs. 7A and 7B, Element FR), to which a magnetic field is applied, having the rotation angle changeable by adjusting the magnetic flux density of said magnetic field (See Figs. 8 and 9), or a liquid crystal polarization rotator, having the rotation angle continuously or discretely rotatable by application of a control voltage, a twisted-nematic liquid crystal polarization rotator,

positioned immediately before said passive polarization rotator and oriented with its entrance crystal axis parallel to the transmission axis of said entrance polarizer.

24. As to claim 59, Terahara teaches providing a spectral filter comprising an entrance polarizer (See Figs. 7A and 7B, Element P1), at least a dispersive polarization rotator (See Figs. 7A and 7B, Element FR) and at least an orientation-sensitive polarizing element (See Figs. 7A and 7B, Element P1, P2 or BP); and tuning said spectral filter by rotating said polarizing element(s) or/and by varying the rotation angle(s) of said polarization rotator(s) (See Pages 4 and 5, Paragraphs 0076-0080).

25. As to claim 60, Terahara teaches the combination of claim 59, wherein said filter is a single-stage spectral filter (See Figs. 7A and 7B), comprising an entrance polarizer (See Figs. 7A and 7B, Element P1), a rotatable exit polarizer (See Figs. 7A and 7B, Element P2; It is noted that the examiner interprets the limitation "rotatable exit polarizer" to be met in that the exit polarizer rotates the polarization of the light passing through it and does not interpret "rotatable exit polarizer" to mean that the exit polarizer has to be physically rotatable about the optical axis.), and a dispersive polarization rotator (See Figs. 7A and 7B, Element FR), and said method comprises the step of tuning said single-stage filter by rotating said exit polarizer relative to said entrance polarizer or/and by varying the rotation angle of said dispersive polarization rotator (See Pages 4 and 5, Paragraphs 0076-0080).

26. As to claim 61, Terahara teaches the combination of claim 60, wherein said single-stage filter is modified to further comprise a rotatable half-wave retarder or an active polarization rotator (See Figs. 7A and 7B, Element FR), and said method further

comprises the step of tuning said filter by rotating said retarder or varying the rotation angle of said active polarization rotator (See Pages 4 and 5, Paragraphs 0076-0080).

27. Claims 6, 8 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Fratello, U.S. Patent Publication 2004/0001255 (hereafter Fratello).

28. As to claim 6, Fratello teaches a spectral filter over a wavelength range comprising elements arranged in cascade along a light beam axis characterized by an entrance polarizer (See Figs. 6A, 6B and 6C, Elements 601, 607 and 614 respectively); at least a dispersive polarization rotator with the rotation angle varying as a function of light wavelength over said wavelength range (See Figs. 6A, 6B and 6C, Elements 602, 608 and 615 respectively, Pages 4-7, Paragraphs 0049, 0060 and 0070); at least an orientation-sensitive polarizing element (See Figs. 6A, 6B and 6C, Elements 606, 613 and 619 respectively); and means for rotating said orientation-sensitive polarizing element(s) about said light beam axis or/and varying said rotation angle(s) (See Figs. 6A, 6B and 6C, Elements 602, 608 and 615 respectively, Pages 4-7, Paragraphs 0049, 0060 and 0070); whereby said polarizing element or at least one of said polarizing elements is a polarizer (See Figs. 6A, 6B and 6C, Elements 601, 607 and 614 respectively), said polarization rotator(s) and polarizing element(s) are arranged behind said entrance polarizer along said beam axis to form tuner(s) such that said polarizing element that is a polarizer works as the exit polarizer of said filter (See Figs. 6A, 6B and 6C), and said filter has its spectral transmission determined by said rotation angle(s) and tunable by rotating said exit polarizer or/and the other(s) of said polarizing

element(s) about said beam axis and further tunable by varying said rotation angle(s) (See examiner's note in section 7(d) of this office action).

29. As to claim 8, Fratello teaches the combination of claim 6, wherein said filter is a single-stage spectral filter over said wavelength range comprising elements arranged in cascade along said light beam axis including an entrance polarizer (See Figs. 6A, 6B and 6C); a dispersive polarization rotator with the rotation angle varying as a function of light wavelength over said wavelength range, selected from optical rotators and Faraday rotators (See Figs. 6A, 6B and 6C, Elements 602, 608 and 615 respectively, Pages 4-7, Paragraphs 0049, 0060 and 0070); an exit polarizer (See Figs. 6A, 6B and 6C); and means for rotating said exit polarizer about said light beam axis (See examiner's note in section 7(d) of this office action); whereby said polarization rotator is sandwiched between said entrance and exit polarizers (See Figs. 6A, 6B and 6C) with the combination of said polarization rotator and polarizer equivalent to a polarizer-tuner and said filter has its spectral transmission determined by said rotation angle and tunable by rotating said exit polarizer about said beam axis relative to said entrance polarizer and further tunable by varying said rotation angle (See examiner's note in section 7(d) of this office action).

30. As to claim 12, Fratello teaches the combination of claims 6 and 8, wherein said polarization rotator is a dispersive optical rotator (See Figs. 6A, 6B and 6C, Elements 602, 608 and 615 respectively, Pages 4-7, Paragraphs 0049, 0060 and 0070), and said filter further comprises a rotatable half-wave retarder (See Figure 6B, Element 611 and Pages 6 and 7, Paragraphs 0058-0067; It is noted that the examiner interprets the

limitation "rotatable half-wave retarder" to be met in that the variable half-wave retarder rotates the phase of the light passing through it and does not interpret "rotatable half-wave retarder" to mean that the half-wave plate has to be physically rotatable about the optical axis.) having its retardation equal or approximately equal to 180° over said wavelength range, an equivalent achromatic or zero-order birefringent retarder or liquid crystal electrically rotatable retarder, positioned immediately behind or before said optical rotator (See Figure 6B). It is noted by the examiner that limitations following "preferably" or "typically" have not been given significant patentable weight.

Allowable Subject Matter

31. Claims 11, 13, 19-29 and 62-66 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

32. Claim 11 is allowable over the cited art of record for at least the reason that the cited art of record fails to teach or reasonably suggest a single-stage filter that is further tunable by rotating said exit polarizer about said beam axis relative to said entrance polarizer, and functions as a one-direction device that transmits and tunably filters light in one direction, but blocks the backward light, with said exit polarizer fixed and oriented at 45° relative to said entrance polarizer, as generally set forth in claim 11, the device including, in combination with the features recited in claims 6, 8, 10 and 11.

33. Claim 13 is allowable over the cited art of record for at least the reason that the cited art of record fails to teach or reasonably suggest a filter having its spectral

transmission determined by the rotation angle of an optical rotator with and tunable by rotating a half-wave retarder about the light beam axis, mechanically or/and electrically, and further tunable by rotating the exit polarizer relative to the entrance polarizer, as generally set forth in claim 13, the device including, in combination with the features recited in claims 6, 8, 12 and 13.

34. The following is a statement of reasons for the indication of allowable subject matter: claim 19 is allowable over the cited art of record for at least the reason that the cited art of record fails to teach or reasonably suggest a spectral filter having n dispersive polarization rotators which have their wavelength-dependent rotation angles in the ratios of integers $1:2:4:8:\ldots:2^{n-1}$ disregarding the rotation sense over said wavelength range and are selected from optical rotators and Faraday rotators, the spectral filter further including a rotatable exit polarizer, as generally set forth in claim 19, the device including, in combination with the features recited in claims 6 and 19. Claims 25-29 are dependent on claim 19 and therefore contain allowable subject matter for at least the same reason as claim 19.

35. Claim 62 is allowable over the cited art of record for at least the reason that the cited art of record fails to teach or reasonably suggest a method of making a single-stage filter comprising a second dispersive polarization rotator and a variable retarder having its retardation switchable between two alternative states; and said method further comprises the step of tuning the filter by switching the retarder in the switched states, as generally set forth in claim 62, the device including, in combination with the features recited in claims 59, 60 and 62.

36. Claim 63 is allowable over the cited art of record for at least the reason that the cited art of record fails to teach or reasonably suggest a method of making an n-stage spectral filter said method comprising the step of tuning said n-stage filter by simultaneously rotating the n rotatable polarizers with the ratios of their azimuths remaining unchanged or so that the n rotatable polarizers are parallel or perpendicular to the entrance polarizer and further by simultaneously varying the rotation angles of the n polarization rotators with the ratios of their rotation angles remaining unchanged, as generally set forth in claim 63, the device including, in combination with the features recited in claim 59 and 63. Claims 64 and 65 are dependent on claim 63 and therefore contain allowable subject matter for at least the same reason as claim 63.

37. Claim 66 is allowable over the cited art of record for at least the reason that the cited art of record fails to teach or reasonably suggest a method of making a filter wherein said method comprises tuning said filter by simultaneously rotating said retarders or said retarders and exit polarizer with the ratios of their orientation angles remaining unchanged or/and by simultaneously varying the rotation angles of said polarization rotators with the ratios of said rotation angles remaining unchanged over said wavelength range or/and adjusting the transmission profile of said filter by varying the retardation of said retarders in a predetermined range, as generally set forth in claim 66, the device including, in combination with the features recited in claim 59 and 66.

Other Related Art

38. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

39. Frosch, U.S. Patent Number 4,129,357 discloses a partial polarizer filter that provides tuning by rotating the entrance and exit polarizers.

Conclusion

40. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek S. Chapel whose telephone number is 571-272-8042. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A. Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek Chupp
DSC
6/27/2006

Arnel C. Lavarias
Arnel C. Lavarias
Primary Examiner
Group Art Unit 2872